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IBM CORPORATION
ROCHESTER IP LAW DEPT. 917
3605 HIGHWAY 52 NORTH
ROCHESTER, MN 55901-7829

EXAMINER	
LOVEL, KIMBERLY M	
ART UNIT	**PAPER NUMBER**
2167	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/754,010	DAY ET AL.	
	Examiner	Art Unit	
	KIMBERLY LOVEL	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-8 and 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-8 and 10-12 are rejected and claims 2, 9 and 13-21 are canceled.

2. In view of the appeal brief filed on 9 December 2008, PROSECUTION IS HEREBY REOPENED. The new grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/John R. Cottingham/

Supervisory Patent Examiner, Art Unit 2167

Specification

3. The disclosure is objected to because of the following informalities: The specification is objected to as failing to provide proper antecedent basis for the claimed

subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). The meaning of every term used in any of the claims should be apparent from the descriptive portion of the specification with clear disclosure as to its import. Correction of the following is required: While the specification mentions the term "function check," the specification fails to define the term "function check." Appropriate correction is required.

Claim Objections

4. Claim 3 is objected to because of the following informalities: Claim 3 states "wherein the error is a function check." Since the specification fails to explicitly define the term, the intentions of the claimed limitation are unclear. It is unclear whether the limitation relates to a function that checks for errors or an error checking mechanism that is actually checking for an error with the function. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Efficient Mid-Query Re-Optimization of Sub-Optimal Query

Execution Plans" by Kabra et al (hereafter Kabra) in view of US PGPub 2004/0267760 to Brundage et al (hereafter Brundage).

Referring to claim 1, Kabra discloses a method for automatic handling of errors within a database engine (see abstract, lines 6-8 – the sub-optimality is considered to represent the *error*), including the further limitations of:

detecting an error while executing a query access plan [execution plan], and wherein the query access plan is of the type generated by a query optimizer (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan);

in response to detecting the error (see page 109, column 2, line 34 – page 110, column 1, line 4 – after the error is determined the query plan is rebuilt since the remainder of the query plan is based on the estimate), automatically rebuilding the query access plan with query optimizer to generate a new query access plan (see page 110, column 1, lines 2-4 and lines 13-15 – upon the determination that the plan is sub-optimal, the query optimizer is re-invoked to generate a new execution plan); and

executing the new query access plan to generate at least a portion of a result set for storage or display (see page 110, column 1, line 15 – the fresh new execution plan for the query is executed).

However, Kabra fails to explicitly disclose the further limitation wherein the error is an execution error of a type that halts execution of the query access plan. Brundage discloses execution of a query (see [0047]), including the further limitations of detecting an error while executing the query, wherein the error is an execution error of a type that

halts execution of the query [error is fatal; terminate execution] (see [0183]; [0185]; and [0220]).

It would have been obvious to one of ordinary skill in the art to utilize Kabra's method to re-optimize a sub-optimal query plan to re-optimize the query of Brundage after the fatal error. One would have been motivated to do so in order to improve the performance and efficiency of applications and queries through the generation of optimal plans.

Referring to claim 3, the combination of Kabra and Brundage (hereafter Kabra/Brundage) discloses the method of claim 1, wherein the error is a function check [error in the join] (Kabra: see page 109, column 2, lines 29-33; see [0183]; [0185]; and [0220]).

Referring to claim 6, Kabra/Brundage discloses the method according to claim 1, further comprising the step of: reporting the error [message to the user] (Brundage: see [0220]).

7. Claims 4, 5, 7, 8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Efficient Mid-Query Re-Optimization of Sub-Optimal Query Execution Plans" by Kabra et al in view of US PGPub 2004/0267760 to Brundage et al and further in view of US PGPub 2002/0198867 to Lohman et al (hereafter Lohman).

Referring to claim 4, while Kabra/Brundage discloses the method of claim 1 further comprising the step of: receiving another error while executing a function within

the new query access plan (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan), Kabra/Brundage fails to explicitly disclose the further limitations of identifying a first implementation method of the function within the new query access plan; and rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function so as to generate a rebuilt query access plan. Lohman discloses the generation of alternative execution plans (see abstract), including the further limitations of identifying a first implementation method [nested-loop join] of the function within the new query access plan and rebuilding the new query access plan by replacing the first implementation method with a second implementation method [hash join] of the function so as to generate a rebuilt query access plan [LEO's adjustments 130 can cause virtually any physical operator of a QEP to change, and may even alter the structure of the QEP 114] (see [0106] and [0107]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of replacing a function as disclosed by Lohman to modify the execution plan of Kabra/Brundage. One would have been motivated to do so in order to achieve tremendous savings by changing the choice of algorithm being utilized (Kabra: page 109, column 2, Section 2.4 Query Plan Modification, lines 6-11).

Referring to claim 5, Kabra/Brundage fails to explicitly disclose the further limitation of logging information about the error, and the new query access plan. Lohman discloses the generation of alternative execution plans (see abstract), including

the further limitation logging information about the error, and the new query access plan (see [0071]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the logging step disclosed by Lohman in order to record the errors of Kabra/Brundage. One would have been motivated to do so in order to improve the efficiency of the optimizer by utilizing information from past errors.

Referring to claim 7, Kabra discloses a method for automatic handling of errors within a database engine (see abstract, lines 6-8 – the sub-optimality is considered to represent the *error*), the method comprising the steps of:

receiving an error while executing a function within a query access plan [execution plan], and wherein the query access plan is of the type generated by a query optimizer (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan);

rebuilding the query access plan with query optimizer to generate a new query access plan (see pages 109, column 2, line 34 – page 110, column 1, line 4 and 110, column 1, lines 2-4 and lines 13-15 – after the error is determined the query plan is rebuilt since the remainder of the query plan is based on the estimate; upon the determination that the plan is sub-optimal, the query optimizer is re-invoked to generate a new execution plan); and

executing the new query access plan to generate at least a portion of a result set for storage or display (see page 110, column 1, line 15 – the fresh new execution plan for the query is executed). However, Kabra fails to explicitly disclose the further

limitation wherein the error is an execution error of a type that halts execution of the query access plan. Brundage discloses execution of a query (see [0047]), including the further limitations of detecting an error while executing the query, wherein the error is an execution error of a type that halts execution of the query [error is fatal; terminate execution] (see [0183]; [0185]; and [0220]).

It would have been obvious to one of ordinary skill in the art to utilize Kabra's method to re-optimize a sub-optimal query plan to re-optimize the query of Brundage after the fatal error. One would have been motivated to do so in order to improve the performance and efficiency of applications and queries through the generation of optimal plans.

While Kabra/Brundage discloses that the plan may be sub-optimal due to the choice of algorithm being utilized (e.g. hash-join vs. indexed nested-loops join) (Kabra: page 109, column 2, Section 2.4 Query Plan Modification, lines 6-11), Kabra/Brundage fails to explicitly disclose the further limitations of identifying a first implementation method of the function within the query access plan; and rebuilding the query access plan by replacing the first implementation method with a second implementation method of the function so as to generate a new query access plan. Lohman discloses the generation of alternative execution plans (see abstract), including the further limitations of identifying a first implementation method [nested-loop join] of the function within the query access plan and rebuilding the query access plan by replacing the first implementation method with a second implementation method [hash join] of the function so as to generate a new query access plan [LEO's adjustments 130 can cause virtually

any physical operator of a QEP to change, and may even alter the structure of the QEP 114] (see [0106] and [0107]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of replacing a function as disclosed by Lohman to modify the execution plan of Kabra/Brundage. One would have been motivated to do so in order to achieve tremendous savings by changing the choice of algorithm being utilized (Kabra: page 109, column 2, Section 2.4 Query Plan Modification, lines 6-11).

Referring to claim 8, Kabra/Brundage/Lohman discloses the method of claim 7, wherein the function is one of a join function [error in the join], an indexing function, a grouping function, and an ordering function (Kabra: see page 109, Section 2.4 Query Plan Modification, lines 7-10; Brundage: see [0107]).

Referring to claim 10, while Kabra/Brundage receiving another error while executing the function within the new query access plan (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan), Kabra/Brundage fails to explicitly disclose the further limitation of rebuilding the new query access plan by replacing the second implementation method with a third implementation method of the function. Lohman discloses the generation of alternative execution plans (see abstract), including the further limitations of identifying a second implementation method [nested-loop join] of the function within the new query access plan and rebuilding the new query access plan by replacing the second implementation method with a third implementation method [hash join] of the function

[LEO's adjustments 130 can cause virtually any physical operator of a QEP to change, and may even alter the structure of the QEP 114] (see [0106] and [0107]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of replacing a function as disclosed by Lohman to modify the execution plan of Kabra/Brundage. One would have been motivated to do so in order to achieve tremendous savings by changing the choice of algorithm being utilized (Kabra: page 109, column 2, Section 2.4 Query Plan Modification, lines 6-11).

While the combination of Kabra/Brundage and Lohman (hereafter Kabra/Brundage/Lohman) fails to explicitly disclose that another error occurs, it would be obvious to one of ordinary skill in the art to apply the same steps to utilized to re-optimize the first sub-optimal plan to optimize a second sub-optimal plan since this is merely a repetitive step that occurs repetitively with any query plan.

Referring to claim 11, Kabra/Brundage/Lohman discloses the method according to claim 10 further comprising the step of: logging information about the error, the another error, and the new query access plan (Lohman: see [0071]).

Referring to claim 12, Kabra discloses a method for automatic handling of errors within a database engine (see abstract, lines 6-8 – the sub-optimality is considered to represent the *error*), the method comprising the steps of:

executing a query access plan comprising a plurality of functions, each function including a first implementation method, and the query access plan of the type generated by a query optimizer (see page 109, column 2, lines 34-37; page 110, column 1, 10-15; and Fig 4);

detecting a first error while executing a first function within a query access plan [execution plan] (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan);

rebuilding the query access plan with query optimizer to generate a new query access plan (see pages 109, column 2, line 34 – page 110, column 1, line 4 and 110, column 1, lines 2-4 and lines 13-15 – after the error is determined the query plan is rebuilt since the remainder of the query plan is based on the estimate; upon the determination that the plan is sub-optimal, the query optimizer is re-invoked to generate a new execution plan); and

executing the new query access plan to generate at least a portion of a result set for storage or display (see page 110, column 1, line 15 – the fresh new execution plan for the query is executed). However, Kabra fails to explicitly disclose the further limitation wherein the error is an execution error of a type that halts execution of the query access plan. Brundage discloses execution of a query (see [0047]), including the further limitations of detecting an error while executing the query, wherein the error is an execution error of a type that halts execution of the query [error is fatal; terminate execution] (see [0183]; [0185]; and [0220]).

It would have been obvious to one of ordinary skill in the art to utilize Kabra's method to re-optimize a sub-optimal query plan to re-optimize the query of Brundage after the fatal error. One would have been motivated to do so in order to improve the performance and efficiency of applications and queries through the generation of optimal plans.

While Kabra/Brundage discloses that the plan may be sub-optimal due to the choice of algorithm being utilized (e.g. hash-join vs. indexed nested-loops join) (Kabra: page 109, column 2, Section 2.4 Query Plan Modification, lines 6-11) and receiving an error during execution, Kabra/Brundage fails to explicitly disclose the further limitation of rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function. Lohman discloses the generation of alternative execution plans (see abstract), including the further limitation of rebuilding the query access plan by replacing the first implementation with a second implementation method [hash join] of the function [LEO's adjustments 130 can cause virtually any physical operator of a QEP to change, and may even alter the structure of the QEP 114] (see [0106] and [0107]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of replacing a function as disclosed by Lohman to modify the execution plan of Kabra/Brundage. One would have been motivated to do so in order to achieve tremendous savings by changing the choice of algorithm being utilized (Kabra: page 109, column 2, Section 2.4 Query Plan Modification, lines 6-11).

While Kabra/Brundage/Lohman fails to explicitly disclose that a second error occurs, it would be obvious to one of ordinary skill in the art to apply the same steps to utilized to re-optimize the first sub-optimal plan to optimize a second sub-optimal plan since this is merely a repetitive step that occurs repetitively with any query plan.

Response to Arguments

8. Applicant's arguments with respect to the prior art rejections of the claims have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIMBERLY LOVEL whose telephone number is (571)272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John R. Cottingham/
Supervisory Patent Examiner, Art Unit 2167

/Kimberly Lovel/
Examiner
Art Unit 2167

13 March 2008
/KL/